

EXHIBIT X



National Transportation Safety Board
Vehicle Recorder Division

Cockpit Voice Recorder Handbook for Aviation Accident Investigations

Office of Research and Engineering
Office of Aviation Safety
Washington, DC 20594

A Reference for Safety Board Staff

1 Director Authority

- 1.1. Permission must be obtained from the Directors of the Offices of Research and Engineering and Aviation Safety regarding any exceptions to the cockpit voice recorder (CVR) standard practices or procedures. It is the discretion of the Directors of the Offices of Research and Engineering and Aviation Safety to grant approval for the exceptions.
- 1.2. It is also the discretion of the Directors of the Offices of Research and Engineering and Aviation Safety to adjust a standard practice or procedure, if necessary for a unique circumstance.

2 Applicable Recorded Audio Data

- 2.1. The laws and policies that govern the procedures regarding CVRs and CVR recordings are generally applicable to any and all audio that is recorded on board an aircraft. Any audio recording that is recovered from an aircraft following an accident or incident is given the same protection and security of a CVR or CVR recording.
- 2.2. Safety Board on-scene staff shall secure any device that records audio, found within the cockpit or cabin, carried by a passenger, or installed in the aircraft. Devices that record audio include, but are not limited to: camcorders, video recorders/cameras, digital cameras, handheld tape recorders, personal digital audio recorders, and flight test equipment. Furthermore, any magnetic tape or digital memory chips found in the wreckage could contain recorded audio and shall be secured by Safety Board staff.
- 2.3. Audio from alternate audio devices shall not be read out or played on scene and the equipment or recording medium shall be secured by the Safety Board to prevent read-out or damage.
- 2.4. In the event that audio from an alternate audio device is recovered, the investigator-in-charge (IIC) shall immediately contact the Director of the Office of Aviation Safety and the Chief of the Vehicle Recorder Division for guidance.

3 CVR Recording Disclosure and Access

- 3.1. CVR recordings and transcripts contain highly sensitive material, and premature or unauthorized release of information by Safety Board employees is grounds for disciplinary action. All Safety Board staff and Members who obtain information concerning the contents of a CVR recording or written transcript, regardless of reason or source, are bound by Federal CVR nondisclosure laws (refer to 49 U.S.C. §1114—*Disclosure, availability, and use of information*).

- 3.2. The CVR specialist, the Directors of the Offices of Research and Engineering and Aviation Safety, and the IIC are the only staff automatically authorized to listen to a CVR recording.
- 3.3. The CVR specialist assigned to the accident ordinarily has complete access to the CVR recording, data and information at all times. Other Safety Board CVR specialists may be called upon to assist with a CVR recording, when necessary.
- 3.4. Any other Safety Board staff is required to consult with the IIC and seek approval from the Directors of the Offices of Research and Engineering and Aviation Safety prior to reviewing a CVR recording or written transcript.
- 3.5. All individuals who listen to a CVR recording are required to sign and log their CVR review or audition into the CVR Audition Log. This is required for each session.
- 3.6. The CVR recording (original or copy) shall not be brought to any other facility for investigative work without the specific approval from the Directors of the Offices of Research and Engineering and Aviation Safety.
- 3.7. The CVR specialist shall keep the IIC apprised of information and activities concerning the CVR or CVR recording.

4 CVR Recorder Recovery: From On Scene to the Audio Laboratory

- 4.1. Upon notification of an accident or incident in which a CVR is installed on the aircraft, the IIC shall attempt to ensure that the CVR circuit breaker is pulled as soon as possible.
- 4.2. The IIC then considers whether the CVR might contain information relevant to the investigation, taking into consideration that the CVR can be 30 minutes or 2 hours in duration. It is possible for the events from an accident or incident to be overwritten when power is applied to the aircraft for an extended time following an event (through its own power or external power). However, some aircraft have an automatic shutoff logic that removes power to the CVR (even if the aircraft remains powered), and possibly allow for the capture of the events. With a CVR part number, the Vehicle Recorder division may assist in determining the type of CVR installed.
- 4.3. The CVR shall not be read out or played on scene.
- 4.4. The CVR unit shall not be opened and the recording medium shall not be removed (i.e., the tape or memory module) until it reaches the audio laboratory at Safety Board headquarters in Washington, D.C.
- 4.5. If the CVR is recovered in water, it shall immediately be packed in water (fresh, if possible) and not be allowed to dry out. Packaging may be accomplished by sealing the

recorder (in water) inside a plastic beverage container with silicon adhesive or a similar sealant.

- 4.6. The CVR must be shipped to Safety Board headquarters in a manner that protects it from damage (i.e., inside a cardboard or wooden box, wrapped in either foam or bubble-wrap or in a container filled with foam peanuts).
- 4.7. The IIC shall contact the Chief of the Vehicle Recorder Division to coordinate the shipment of the CVR to headquarters.
- 4.8. The Chief of the Vehicle Recorder Division assigns the CVR to a CVR specialist.
- 4.9. The CVR may be sent to Washington on board a commercial airplane. This usually needs to be coordinated with the captain of the flight. The IIC must also arrange for headquarter staff to meet the arriving flight. If necessary, the CVR shall be packaged appropriately.
- 4.10. Preliminary recorder and accident information shall be sent/mailed to the Chief of the Vehicle Recorder Division. The CVR specialist shall also be included in the notification.

5 CVR Arrival at the Safety Board Audio Laboratory

- 5.1. The CVR specialist is responsible for handling and securing the CVR, the original recording medium, and any audio copies.
- 5.2. If the recorder is damaged, the CVR specialist extracts the recording medium with the use of cutting tools or other special equipment. This is not ordinarily a group activity.
- 5.3. The CVR specialist checks the recording to determine that useable audio information has been recorded (CVRs may be erased or malfunction and contain no useable audio).
- 5.4. Useable audio is defined as any audio that is recorded by the CVR and includes, but is not limited to: the accident events, overwritten post accident discussions, and aircraft noises.
- 5.5. The CVR specialist notifies the Directors of the Offices of Research and Engineering and Aviation Safety of the condition of the audio in the recording.
- 5.6. The CVR specialist downloads the original tape or memory from the CVR. The recording is digitally copied in its entirety without alterations or filters. This task is ordinarily accomplished during the initial audition, if practicable.
- 5.7. All non-foreign CVR recordings are digitally archived regardless of whether the recording contains useable audio.

- 5.8. Although most subsequent audio work is accomplished using the digital copy of the original recording, the original recording may be used.

6 CVR Initial Audition

- 6.1. If the recording contains useable audio, the initial audition is conducted by the Directors of the Offices of Research and Engineering and Aviation Safety (or their designees).
- 6.2. The original recording is typically used for the initial audition. A digital copy is made as soon as possible – during the initial audition, if practicable.
- 6.3. Any critical information that might assist in the field phase of the investigation is relayed to the IIC and other appropriate on-scene staff, by either (or both) Directors of Aviation Safety and/or Research and Engineering (or their designees).
- 6.4. The discussion shall be held over a secure landline telephone – not a portable mobile phone – and not routed through any conferencing facility.
- 6.5. The CVR recording shall never be played over the telephone.
- 6.6. If the recording contains audio information pertinent to the investigation, the IIC and the Directors of the Offices of Research and Engineering and Aviation Safety (or their designees) determine whether it is appropriate to convene a CVR group.
- 6.7. If a CVR group is to be convened, the IIC and the Directors of the Offices of Research and Engineering and Aviation Safety (or their designees) determine which parts of the transcript shall be transcribed (if the entire recording is not going to be transcribed). In general, the entire recording is transcribed in the event of a major investigation.

7 Planning the CVR Group Meeting

- 7.1. Not all CVRs that are sent to Safety Board headquarters result in a CVR group convening. The Directors of the Offices of Research and Engineering and Aviation Safety, in consultation with the IIC, determine if a group is necessary.
- 7.2. The CVR specialist is the group chairman for the CVR portion of the investigation and shall be included in any correspondence and discussions that pertain to all group chairmen participating in the investigation.
- 7.3. The IIC must coordinate with the CVR group chairman to select a tentative date for a CVR group meeting at Safety Board headquarters. The group meeting does not necessarily occur immediately after the CVR is sent to headquarters.
- 7.4. The IIC shall notify the party coordinators that a CVR group is convening.

- 7.5. The IIC must ensure that only parties appropriate to the CVR group are invited: FAA (must be invited), and typically, the manufacturer, pilot union, and owner/operator. Flight crew cannot participate as group members. The Director of the Office of Aviation Safety or the Director of the Office of Research and Engineering must approve the party representatives that the IIC recommends.
- 7.6. Party representatives that can provide a technical contribution may be assigned to the CVR group. The CVR group shall include at least one pilot typed or current in the accident aircraft model. Typically other individuals seated on the CVR group include those familiar with the crew's voices, and those familiar with company procedures. The party coordinator is not automatically qualified to be a CVR group member.
- 7.7. Ordinarily, only one representative per party is seated on the CVR group. Additional party representatives may be seated, at the discretion of the Directors of the Offices of Research and Engineering and Aviation Safety, in consultation with the IIC and the CVR group chairman.
- 7.8. Transcribing a 30-minute recording may be accomplished in one day, but typically continues late into a second day or more. The IIC finalizes a meeting time and date with the group members and reconfirms with the CVR group chairman.
- 7.9. The IIC shall advise the party representatives attending the CVR group meeting that once the CVR group meeting has started the group members are not allowed to leave the group until the transcript of recorded events has been completed and the CVR group chairman authorizes the group to be dismissed.
- 7.10. The IIC must forward the names of the CVR group members to the CVR group chairman prior to the CVR group meeting day. Only authorized individuals are permitted to participate in the group. Authorized individuals are those individuals recommended by the IIC and approved by the Director of the Office of Aviation Safety or the Director of the Office of Research and Engineering.
- 7.11. For a regional investigation, if the FAA's regional FSDO representative is unavailable for the CVR group meeting, the IIC shall contact the FAA's Accident Investigation Division (AAI-100 in Washington D.C.) as soon as possible. An AAI-100 investigator is assigned to represent the FAA or the FAA may choose to decline participation. The CVR group chairman shall contact the AAI-100 division before the day of the group meeting to ensure that the AAI-100 division has been notified of the CVR group activities.
- 7.12. The IIC shall advise CVR group members to go to the 6th floor reception area at the 490 L'Enfant Plaza office elevators and ask the receptionist to contact the CVR group chairman.
- 7.13. The IIC is welcome to attend the CVR group meeting, but his or her presence is not required.